



**BOARD FOR PROFESSIONAL ENGINEERS AND LAND SURVEYORS**

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# **California State-Specific Professional Land Surveying Examination**

## **Information for Examinees April 2003**

**Examination Information and Administration**

**Test Plan Information and Sample Questions**

# **Examination Information and Administration**

## **Introduction**

The mission of the Board for Professional Engineers and Land Surveyors is to safeguard property and public welfare from incompetent or negligent land surveying practice. As set forth in the Professional Land Surveyors' Act, the Board is mandated by law to test all applicants for licensure as Land Surveyors on their ability to apply his or her knowledge and experience and to assume responsible charge in the professional practice of land surveying. The Board accomplishes its mandate by setting forth examination standards to reliably determine those applicants who are competent to provide land surveying services to the public.

This brochure provides information specific to the California State-Specific Professional Land Surveying examination. Applicants for licensure as a land surveyor must take and pass the California State-Specific Professional Land Surveying examination (a four-hour examination), the national Principles and Practices of Land Surveying examination (a six-hour examination), and the California Laws and Board Rules examination (the "Take-Home examination") in order to become licensed as a Professional Land Surveyor. The Board recommends retaining this brochure for future reference.

## **Examination Description**

The California State-Specific Professional Land Surveying examination is comprised of 100% design (essay) problems.

The subject matter of the Professional Land Surveyor examination relates to the principles and practice of land surveying. Examinees are examined on elements of current land surveying practice as dictated by a Board-approved Test Plan based on an Occupational Analysis, including the examinee's knowledge of general land surveying principles, methods of solving the problems, and reasoning ability as demonstrated in the examinee's solutions. Examinees should develop solutions with calculations, findings, and statements arranged in a professional, organized, and legible manner.

The specific content of the California State-Specific Professional Land Surveying examination is reflected in the California Professional Land Surveyor Examination Outline and is included in this study guide. Items are developed to reflect situations typical to the practice of land surveying and examinees are required to respond to specific problem requirements as they relate to the situation presented.

Examinees are provided individual solution booklets for each problem. Examinee's solutions and answers to each problem must be included in the designated solution booklet to facilitate grading of the problem. Bar code labels distributed at the examination sites are used to link solution booklets to the correct examinee. This process ensures the anonymity of the examinees during the grading process.

Problems typically test examinees not only on the answers specifically required, but also on the examinees' knowledge of principles, the logic and methodology in solving the problems and the reasoning ability as demonstrated in their solutions. Problems are scored by licensed professional land surveyors using grading plans that are developed in conjunction with the examination items. Sample design (essay) problems are provided later in this document.

## **Take-Home Examination**

The Board is required to administer a take-home examination which tests the applicants knowledge of important laws, rules, and regulations pertaining to the practice of professional land surveying in California. Answers to these examination questions may be found in the plain language pamphlet that is distributed with the application for examination. Applicants may also want to purchase the Professional Land Surveyors' Act and Board Rules. This document may be purchased by mailing a check for five (5) dollars to the Board, attention Cashier, with a note that specifies your request.

The take-home examination is available on the Board's website at [www.dca.ca.gov/pels](http://www.dca.ca.gov/pels). Once you have completed it, simply print it out and send it to our office for scoring. We recommend that you submit your take-home exam within thirty (30) days from the date of the Land Surveyor examination in order not to delay your examination results. A passing score on this examination is required for licensure.

## **Examination Locations**

Approximately two weeks prior to the scheduled examination date, examinees are notified by mail of the location and time to appear for the examination. Examination sites will be located in the Northern, Central and Southern areas of California. Examinees who do not live in the immediate areas of an examination facility must expect to travel to the assigned facility. Examination sites are assigned by the applicant's zip code included in the address of record. Not all examinations are administered at each examination site. Therefore, you may not be scheduled at the site nearest your address of record. You may request to be scheduled at a specific site offering your discipline of examination by writing to the Board at least thirty (30) days prior to the examination date.

## **Examination Procedures and Materials**

In order to gain admittance, examinees must present their admission notice and at least one form of photo identification. There will be no exceptions. (See Photo Identification)

Examinees are responsible for bringing their own materials in and out of the examination room. The amount of material an examinee may bring into the examination room is limited to what the examinee can carry in one trip.

Examinees should bring the following materials to the examination in addition to reference materials:

Non-QWERTY keyboard calculator(s)	scale(s)
sharpened #2 pencils	triangle(s)

Any calculating/computing/data storage device having a QWERTY keyboard arrangement similar to a typewriter or a keyboard will NOT be allowed for the exam. These devices include, but are not limited to palmtop, laptop, handheld or desktop computers, calculators, databanks, data collectors, scanners, and organizers.

Thirty (30) to sixty (60) minutes is allotted for lunch between morning and afternoon examination sessions. Examinees should bring their own food and beverages on the day of the examination. No eating, drinking, or smoking is allowed in the examination area.

Unauthorized individuals will not be permitted into the examination area, and examinees must vacate the examination room after each examination session. Examinees will be allowed to exit the examination facility once they have finished the examination, however, examinees are not allowed to exit the examination facility during the first sixty (60) minutes or the final ten (10) minutes of the examination.

## Photo Identification

In order to gain entrance into the examination, photo identification is required and you will **NOT** be admitted without it. Identification will **ONLY** be accepted if it meets **ALL** of the following criteria:

1. Issued by a state or federal government agency (including other U.S. states and foreign countries) [Student identification cards or employee identification cards will NOT be accepted]
2. Contains your photograph
3. Contains your visible signature
4. Contains your (typed) name

If you do not have identification that meets **ALL** of the above criteria, you will not be allowed to sit for the examination. **THERE WILL BE NO EXCEPTIONS.**

## Special Accommodations

The Board is in full compliance with the Americans with Disabilities Act (ADA). All requests for special accommodations must be made in writing to NCEES at least sixty (60) days prior to the examination date. You must complete the Special Accommodations Questionnaire and submit it, along with supporting documentation to the address on the Board. Do **NOT** submit the form or documentation to the Board; this will delay processing your request.

Religious Accommodation Requests, along with supporting documentation, must be submitted to NCEES at least sixty (60) days prior to the examination date. Do NOT submit the form or the documentation to the Board; this will delay the processing of your request.

## **Late Admission**

Examinees can be admitted up to sixty (60) minutes after the timed portion of the exam has begun, however, no additional time will be given. Examinees arriving more than sixty (60) minutes after the examination has begun will not be admitted. Extra time to complete the examination will not be given to late arrivals.

## **Security**

During the exam administration, examinees are not permitted to discuss or remove examination materials from the examination sites at any time. Examinees are prohibited from sharing materials or communicating with one another during the examination. Writing on any material other than supplied examination material is prohibited. All examination booklets and related materials are copyrighted by the Board for Professional Engineers and Land Surveyors, and are confidential. The Board is committed to maintaining the security and confidentiality of all examination materials and data during every phase of development, program implementation, and storage.

The Board strictly enforces examination security. Conduct that results in a violation of security or disrupts the examination will result in the confiscation of the examinee's examination and the examinee's removal from the testing site. Such conduct may also cause the examinee to be barred from future examinations for a period of time, and could result in the filing of criminal charges. In addition the examinee could be held liable for actual damages and cost of litigation up to ten thousand dollars (\$10,000).

## **Failure to Appear for Examination and Postponements**

Failure to appear for a scheduled examination will result in a forfeiture of the examinee's fee and require submittal of a refile application.

Postponement of an examination is at the discretion of the Board's Executive Officer, and is only granted under extenuating circumstances. Circumstances that may be considered reasonable cause for postponement include personal illness or injury, serious illness or injury of an immediate family member, work assignment outside the continental United States, or an accident or mechanical breakdown of the examinee's vehicle on the morning of the examination. Postponement requests must be submitted in writing, and accompanied by supporting documentation that can verify the request. Requests must be submitted either prior to the examination date or postmarked within ten (10) days after the scheduled examination.

## **Abandoned Applications**

In the absence of special circumstances any of the following actions by an applicant for licensure shall be considered to constitute abandonment of the application, and shall result in cancellation of the application with no refund of the filing fee:

- a. Failure to provide additional information or references within ninety (90) days following the mailing of a request by the Board's staff; or
- b. Failure to complete that examination to which the application has been assigned within two (2) years from the date of filing of the application; or
- c. Failure to appear for examination at the designated time and place unless a postponement has been obtained in accordance with Rule 446; or
- d. Failure to appear for examination at the designated time and place after having obtained two (2) postponements.

## **Address of Record and Address Changes**

Whichever address you use as your address of record will be available to the public on the Board's Internet web site. If you do not want your home address made public, you may want your address of record to be your business address or post office box. Each applicant or licensee of the Board must file an address change affidavit with the Board office within thirty (30) days of change.

## **Review Courses**

The Board does not endorse any review course or material provided as study aides. If you are interested in obtaining information on review courses, we suggest you contact your local university or land surveying society.

## **Design and Multiple Choice Comment Form**

As part of the examination program, the Board provides examinees with an effective way to identify and comment on suspected multiple choice and/or design problems. If you feel a question warrants a review, a "Comment Form" must be completed. "Comment Forms" are distributed at the exam site upon request and must be mailed to the Board no later than ten (10) days following the examination to ensure consideration of the comment(s) prior to scoring.

## **Grading Process**

Problems are solved through calculations, written answers, and graphic presentations completed by the examinee in designated solution booklets. Each problem solution completed by an examinee is graded independently by at least two (2) licensed professional land surveyors who

have been trained as graders. Discrepancies in the two- (2) grader findings are resolved by further grading by another licensed professional Land Surveyor. Procedures and standards approved by the Board are utilized to ensure that the process is objective and uniform. Solutions are graded without knowledge of the examinees' names or the scores assigned by other graders.

Graders are trained to apply explicitly established scoring criteria and performance standards for each problem, method, and solution. Item Writers, in conjunction with the development of the problems, develop the scoring criteria and grading plans. The grading plans, like the items, are based on the current Board approved Test Plan. Points are assigned to the problems, and to the grading elements within problems, according to their weight as designated by the Test Plan. *A grading element may be the correct identification of a boundary line, controlling corners, a correct equation or formula, a correct method, a correct reference, or some other component of the problem requirement.* The predetermined point values are awarded for each grading element correctly addressed in an examinee's solution. Partial credit for a grading element is NOT allowed. This methodology does not require a correct response to each problem requirement of an item, or grading element of a problem requirement, for an examinee to pass the examination. There is no minimum point value that must be achieved to receive a passing score.

## **Final Results**

Examination results are mailed to the examinees approximately eighteen (18) weeks after the examination. Examinees should not call the Board office, as results will not be given out by phone.

The examination application fee does not include the license fee. Examinees passing the exam are licensed for a minimum of three (3) months. Immediately prior to expiration of that license, the new licensee will receive a renewal notice from the Board. A license is valid as long as the renewal fee is paid and the license has not been suspended or revoked.

## **Examination Appeals**

Examinees who fail the examination and are within 15% of the passing score, may appeal their performance. Examinees must review their examination to appeal their results. Dates, times, and locations for review/appeal sessions will be determined by the Board and this information will be included with the result notices for failing examinees.

Within twenty-one (21) days from the date of the result notice, examinees must submit their request to review/appeal and the one hundred thirty-four (\$134) dollar review/appeal fee. At the review/appeal session, examinees will be given a copy of the examination, a scoring plan, test booklets (solution booklets) which includes their solutions. The information provided will not include solutions to the problems, but will identify the elements within a problem requirement for which points are assigned, and the point value of each element. A performance report will also be provided which will reflect the points awarded for the solution for each element.

Appeals must be submitted on the appeal forms issued at the review/appeal session and at or before the time the review/appeal session concludes.

An appeal must contain a comprehensive, coherent, and plausible explanation of how and why the original response to the problem is correct in order to be forwarded for regrading. New or additional information will not be considered. Only an explanation regarding the original response provided during the examination will be considered. Appeals that do not meet the Board's established criteria for regrading will be denied.

## **Refile Application**

An applicant failing an examination may be examined again when they sign their fail notice and include a check within the specified period of time. The fee for refile is the same as the original application fee.



## **Test Plan Information and Sample Questions**

The Board-approved Test Plan for a licensing examination is the vital link between the examination and professional practice. It defines the content of the examination by identifying the subject-matter areas to be covered and by establishing the relative emphasis each content area should be given. Typically, test plans are updated every five (5) years to ensure that they reflect actual tasks performed by licensed land surveyors.

In 2002, a committee consisting of a diverse group of California licensed land surveyors developed a survey (Task Analysis) consisting of statements describing the tasks and knowledge related to competent entry-level land surveying practice. This survey was distributed to 2800 California licensed land surveyors throughout the state. The survey respondents' ratings were analyzed and used to develop the new validated Professional Land Surveyor Examination Test Plan. The first California State-Specific Professional Land Surveying examination developed under the new Board-approved Test Plan will be administered in April 2003. Since 1993, the Board has contracted with an outside vendor for the development, production, grading, and scoring of the Professional Land Surveyor examination.

### **Examination Development Processes**

Throughout the California State-Specific Professional Land Surveying examination writing and review processes, licensed land surveyors with content expertise and exam development experience have devoted a significant amount of skill and effort to develop an examination that meets the highest standards for exam construction and that is a reliable measure of land surveying practice. The following is an overview of the examination development process, facilitated by Professional Management and Evaluation Services (PMES).

#### **Examination Construction/Item Weighting Conference**

The Examination Development Committee, comprised of licensed Professional Land Surveyors, convenes to review the Test Plan and outline the construction of a new examination. Through the review of performance data for previously used items, the committee selects and revises items as necessary to conform to the requirements of the Test Plan from the existing item bank. Additionally, the Committee develops new items and grading plans to be incorporated into the new examination.

#### **Examination Review and Item Weighting Conference**

The Examination Development Committee reconvenes as a group to review and refine items selected and developed for the new examination, further develop grading plans, assess adequacy of time allotted to complete the exam, and assign point values to items and elements.

#### **Field Testing/Board Review**

Six to eight (6-8) newly licensed land surveyors take the newly constructed examination under simulated test conditions. After completing each item, the field testers answer a set of questions regarding each item's clarity; level of difficulty, importance, and the time needed to answer the questions included in the examination. Any subject areas that should have been tested, but were not; areas that were tested, but were unnecessary or overemphasized (in depth or difficulty);

ambiguous questions and time constraints are modified as necessary to address the issues identified in this process. This critical phase of examination review may reveal ambiguities in the wording of an item, elicit an acceptable alternate response, disclose unanticipated response patterns, or address time issues. Any of these may require further refinement of the item before final approval and administration.

#### Setting a Pass/Fail Standard

Because each examination is considered independent of any previous administration and levels of examination difficulty may vary, the Board adopts a criterion-referenced passing score. A criterion-referenced passing score applies minimum standards for competent practice to all examinees regardless of the form of the examination administered.

Eight to ten (8-10) licensed Professional Land Surveyors representing the demographic diversity of the land surveying profession convene to assess the pass/fail standard for the examination. In general, the group members estimate the difficulty of the examination questions and criticality of the questions to the practice of land surveying and recommend to the Board a preliminary pass/fail standard for the exam. The pass/fail standard is established to distinguish between those examinees whose performance equals or betters the requirement for minimum acceptable competence in the area of land surveying. The concept of “minimum acceptable competence” is redefined at each standard setting to ensure that participants have a common frame of reference for assessing entry-level professional land surveyor minimum competence.

Throughout the entire cycle of examination development and grading, the examination is reviewed by approximately forty to sixty (40-60) licensed Professional Land Surveyors. This exposure ensures the validity and reliability of the examination and the discovery of any flaw that may exist in an examination before it is graded and a standard set.

### **Levels of Item Complexity**

Test items are developed in accordance with the Board approved Test Plan to ensure that the examinations are legally defensible, and assess to the fullest extent possible the tasks and knowledges related to land surveying principles and practice. Problems are developed to assess high-level cognitive skills such as a examinee’s ability to interpret technical data, make sound inferences, solve technical problems, make appropriate professional judgments, and apply principles of practice in a variety of situations. There are four (4) levels of thought processes that can be applied in constructing examination items. They are, in order of increasing level of complexity: knowledge, comprehension, applications, and analysis. A description of each level follows:

**Knowledge-Level Requirements** – Knowledge-level items require that examinees remember information that they have previously learned. The key feature of this type of item is that the examinees need only recall information and indicate the correct choice. Because professional practice entails much more than the memory of information, it is recommended that items be developed to test competencies above this level.

**Comprehension-Level Requirements** – Comprehension-level items require the examinee to demonstrate an understanding of information. This can be done by requiring

the examinee to identify a concept or a principle that is presented in the item by an indirect or implicit means, or by requiring the examinee to elaborate in his or her own words on the similarities, differences, and implications for practice with respect to a number of concepts or principles.

**Application-Level Requirements** – The application-level of testing goes another level beyond an examinee’s ability to use knowledge in a given situation. It tests the examinee’s ability to understand information and to demonstrate the correct use of this understanding in various situations.

**Analysis-Level Requirements** – Analysis-level items require the examinee to critically evaluate information, to identify and weigh the strengths and weaknesses of procedures, to interpret technical data and derive a conclusion, and entails an assessment of the implications of actions including the consideration of contingencies for failures or complications.

In a licensing examination, job-related items requiring higher level thought processes are much more appropriate than simple knowledge-based items. Examinees are required to demonstrate comprehension, to apply their knowledge, and to analyze situations whenever possible. Every effort is made to develop practice-related test problems at the higher cognitive levels (comprehension, application, and analysis) and to limit the number of knowledge-based items.

Problems measure examinee behavior by simulating a task to be performed in relation to solving real world problems. For example, describing how data from a laboratory test would be used to diagnose and solve a problem; describing how a hypothetical problem would be handled and a solution developed and implemented to resolve it, etc. The problems require examinees to demonstrate their ability to perform a variety of processes. One problem can be designed to assess competence in several content areas, thus requiring the examinee to integrate knowledge and ideas in a situation simulating actual practice.

## Examination Definitions

The instructions on the examination have been developed using a number of key words. When these key words are used in a question, candidates should apply the following meanings when answering the questions:

**Calculate:** An answer derived from the application of mathematical logic or coordinate geometry. Unless otherwise instructed, you must show **ALL** steps in your calculations including reference to tables or charts used as part of your solution. Coordinate geometry calculations can be performed with software without showing intermediate steps.

**Describe:** A narrative answer-two or three sentences, or a paragraph.

**Determine:** The use of a mathematical procedure to establish distances, dimensions or elevations.

<b>Draft:</b>	The use of hand-drafting techniques to produce a technically adequate map that meets professional standards.
<b>Explain:</b>	A narrative answer, in sentences, that provides the reasons, legal principles, or logic for your answer.
<b>Identify:</b>	A brief description that explicitly establishes the position of an object (e.g. a monument) or a geometric entity (a point, line, etc.).
<b>Justify:</b>	A narrative answer that provides the reason for an answer or solution.
<b>List:</b>	A brief answer-a word or two.
<b>Reference:</b>	The citation of a reference must include book title, edition, page, etc.
<b>Sketch:</b>	A schematic, free hand drawing of a plat or a detail, which includes a “key” that defines symbols and terms, as appropriate. Unless instructed to do so, your sketch does not have to be to scaleable. Use standard symbols, linework, and text for your sketch or map.
<b>Verify:</b>	A mathematical or nonmathematical verification that shows or proves that some value, result, or term is logically valid or true, within tolerances.